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BASELINE
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# MARSHALL PROCEDURES AND GUIDELINES

## ED01

# METRIC USAGE PLAN

## DOCUMENT HISTORY LOG

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| Baseline | | 7/10/00 | |
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PREFACE

## P.1 PURPOSE

This document provides overall guidance for the use of the International System of Units, commonly know as the metric system of measurement, on all programs and projects for which Marshall Space Flight Center (MSFC) has lead responsibility. The policies and procedures established will maximize the benefits of using the metric system while minimizing disruption of operations, inconvenience, and cost.

## P.2 APPLICABILITY

This Directive applies to all MSFC organizations and programs/projects.

## P.3 AUTHORITY

The MSFC Metric Usage Plan is responsive to:

a. Public Law 100-418, Section 5164 (102 Stat. 1107), "The Omnibus Trade and Competitiveness Act of 1988"

b. NPD 8010.2, "Use of the Metric System of Measurement in NASA Programs"

c. Executive Order 12770, "Metric Usage in Federal Government Programs," dated January 25, 1991

## P.4 APPLICABLE DOCUMENTS

a. IEEE/ASTM SI 10-1997, "Standard for the Use of the International System of Units (SI): The Modern Metric System"

b. MPG 1410.2, "Marshall Management Directives System"

c. "NASA Metric Transition Plan," dated February 20, 1992

## P.5 REFERENCES

NPG 7120.5, "Program and Project Management Processes and Requirements"

## P.6 CANCELLATION

None

Original Signed by
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Director

DOCUMENT CONTENT

## 1. DEFINITIONS

1.1 Dual Dimensioning. The use of both inch-pound and metric units on drawings and in documents. Used, for example, where individual components may be designed, produced, and described using either of the two systems, but dimensions and specifications are shown using both metric and inch-pound units, listing metric units first and inch-pound units second in parentheses.

1.2 Hard Metric. The use of metric units as the basis of measurement rather than mathematically converted inch-pound units.

1.3 Hybrid System. The use of both inch-pound and hard metric values to specify or describe different elements of a system. For example, the dimensions of an internal system component may be designed or specified using inch-pound units, while external fittings are metric so that the unit can interface with a system that is otherwise metric.

1.4 Inch-Pound (English) System. The system of units currently used in the United States based on traditional English units and also known as the "customary" system of units.

1.5 International Standards. Standards created by representatives from two or more countries and in turn are used in more than one country.

1.6 Program/Project. Any NASA program or project meeting the definition of a program or project in NPG 7120.5, "Program and Project Management Processes and Requirements."

1.7 Metric System of Measurement. The International System of Units (or SI from the French "Le Systeme International d'Unites") as established by the General Conference on Weights and Measures in 1960 and as interpreted or modified for the United States by the Secretary of Commerce.

1.8 Metrication. Any act that increases use of the metric system, including conversion of measurement-sensitive processes and systems to metric units and training in the use of the metric system.

1.9 Soft Metric. The result of mathematically converting existing inch-pound measurements into metric equivalents; physical dimensions are not changed by such conversion.

## 2. RESPONSIBILITIES

2.1 The Center Director shall be responsible for:

2.1.1 Ensuring timely evaluation during the Program/Project Formulation Phase of the opportunities and requirements for use of the metric system on those programs/projects or elements for which MSFC has lead responsibility.

2.1.2 Approving/rejecting MSFC waivers on the use of the metric system on programs/projects for which MSFC has lead responsibility.

2.2 Center Program/Project Managers and Center Directorate Directors/Managers shall be responsible for:

2.2.1 Implementing the stated policies noted herein and within Applicable Documents (paragraph P.4).

2.2.2 Preparing and submitting to the MSFC Center Director requests for MSFC waivers, in accordance with MPG 1410.2, for program metrication requirements on those programs/projects or elements for which MSFC has lead responsibility.

2.2.3 Preparing and submitting requests for waivers to NPD 8010.2 regarding program metrication requirements, in accordance with Appendix B of the NASA Metric Transition Plan. The approved MSFC waiver shall be included with this waiver package to be sent to NASA Headquarters for final approval by the NASA Chief Engineer.

2.2.4 Implementing necessary metric awareness and training for personnel, and initiating metric pilot programs.

2.2.5 Establishing requirements for metric parts and material supplies to be used on programs/projects for which MSFC has lead responsibility.

2.3 The Center Metric Coordinator shall be responsible for:

2.3.1 Serving as the point of contact for all metrication activities at MSFC, for liaison with the responsible NASA Headquarters Office, other Government Agencies, industry, news media, educational institutions, chamber of commerce, planning groups, and the public.

2.3.2 Encouraging the use of the metric system with displays, handouts, and media articles during such times as National Metric Week or MSFC Open House to further its exposure.

## 3. PROCEDURE

3.1 Metric units used within MSFC shall be as described in IEEE/ASTM SI 10-1997, "Standard for the Use of the International System of Units (SI): The Modern Metric System." The terms metric, metric system, and metric units are used interchangeably with the term SI.

3.2 Existing designs on programs/projects for which MSFC has lead responsibility and are dimensioned in inch-pound units shall not be converted to metric units, unless it is determined to be practical, economically feasible, or will not cause significant inefficiencies or loss of markets. The measurement units in which a system originally was designed shall be retained for the life of the system.

3.3 Physical and operational interfaces between metric items and inch-pound items shall be designed to ensure interoperability.

3.4 All technical material produced by a program/project (technical reports, drawings, etc.) shall use metric units of measurement. Inch-pound units may be cited in parentheses. The use of a table in documents to convert specific dimensions in the document from one system of measurement to the other is acceptable. Use of dual dimensions (both metric and inch-pound) on drawings shall be avoided.

3.5 In a hybrid system of both inch-pound and metric elements, take the necessary actions to ensure that the metric elements are properly marked and identified to avoid confusion.

3.6 When purchasing new shop, laboratory, general purpose test equipment, and instruments, the responsible MSFC element manager shall specify features that shall allow direct measurement in metric units or both metric and inch-pound units.

3.7 MSFC shall actively support the use of the metric system in the development of U.S. and international technical standards.

## 4. RECORDS

Waivers resulting from this procedure will be maintained and dispositioned in accordance with MPG 1410.2.

## 5. FLOW DIAGRAM

None